ECN-81-02

Ontario Motor Vehicle Accidents – An Economic Appraisal

Richard Slocum
Senior Research Officer
Ergonomics Research Office

Published by:
The Policy Planning and Research Division
Ontario Ministry of Transportation and Communications
Hon. James W. Snow, Minister
H.F. Gilbert, Deputy Minister

Published without prejudice
as to the application of the findings.
Crown copyright reserved; however, this
document may be reproduced for non-commercial
purposes with attribution to the Ministry.

For additional copies write:
The Editor
Research and Development Branch
Ministry of Transportation and Communications
1201 Wilson Avenue
Downsview, Ontario
M3M 1J8

September 1981

CONTENTS

Page

PREFACE iv

1/ INTRODUCTION 1
1.1/ Accident Statistics 1

2/ ECONOMIC APPRAISAL 2
2.1/ Introduction 2
2.2/ The Costs Associated with Motor Vehicle Accidents 2
2.2.1/ Property Damage 2
2.2.2/ Health Care 3
2.2.3/ Production Losses 5
2.2.4/ Funeral Cost 6
2.2.5/ Insurance Operating Expenses 7
2.2.6/ Legal and Court Fees 7
2.2.7/ Accident Investigation 7
2.2.8/ Cost to Friends and Relatives 8

3/ PROVINCIAL ESTIMATE OF TOTAL ECONOMIC COSTS 9

4/ REFERENCES 10

LIST OF TABLES

PAGE

1/ Motor Vehicle Accident Facts 1

2/ Average Expenditures Per Victim Who Incurred Respective Component Cost 3

3/ Average Total Cost of Active Treatment by Injury Location . . . 4

4/ Average Total Cost of Active Treatment by Severity 5

5/ Accident Investigation Costs 7

6/ Ontario Estimate of Motor Vehicle Accident Economic Cost (1980) 9

PREFACE

The following report is an outgrowth of an R&D Branch working paper "Accident Cost Determination - Status on Current Figures," 1979, by Thomas Evans (Waterloo Co-operative Student). It includes data from the MTC/MOH survey of hospitalized motor vehicle accident (MVA) victims.[1]

The findings are presented by cost group. Unfortunately, in some instances, only total costs are available (insurance costs) and in others, the data base is incomplete (injured victim data only for those treated at a hospital immediately after the accident). Consequently, the figures must be viewed as an understatement of the cost.

Richard Slocum
August, 1981

---

[1] This survey is reported in two special reports on the social, personal, and economic costs of personal injury accidents. They are:

- INJURY -- An Ontario Survey of the Societal and Personal Costs of Hospitalized Motor Vehicle Accident Victims, report number SP-002 (Summary), Research and Development Branch, Ontario Ministry of Transportation and Communications, Downsview, Ontario.
- op. cit., report number SP-003 (Technical Report).

1/ INTRODUCTION

1.1/ Accident Statistics

The Ministry gathers numerous accident statistics which provide a real perspective on the extent of the problem (see Table 1). This report will supplement this information from an economic viewpoint.

Table 1/ Motor Vehicle Accident Facts

	1980
Total Reportable MVA*	196 501
Property Damage Only	127 814
Personal Injury/Accidents	67 391
Fatal Accidents	1 296
Persons Injured	101 367
Persons Killed	1 508
Motor Vehicle Registered	4 758 010
Vehicle Kilometres Travelled	72 419 000 000
Ontario Population	8 570 000
Drivers Licensed	4 993 531

* "Reportable" limited to accidents sustaining damages in excess of $400 or an injury or fatality.

Source: 1980 Ontario Motor Vehicle Accident Facts, MTC, 1981, p. 3.

2/ ECONOMIC APPRAISAL

2.1/ Introduction

Economics is the study of resource allocation in the production of goods and services to meet people's needs and wants. In appraising a motor vehicle accident, an economist must estimate the effect on resource allocation. In other words, what has changed as a result of the accident? Are economic resources being used differently? If the answer is yes, then society has paid an "opportunity cost". Opportunity cost is the production/output that must be foregone because we have decided to use these resources somewhere else. The "somewhere else" in this case is the allocation of resources to the after-effects of an accident. For example, money is spent for extra hospital beds, rather than spending it on a new day-care centre.

In other words, if society has accidents, our standard of living will be lower, since we have limited resources.

The appraisal that follows attempts to quantify that loss in dollar terms. Clearly, there are costs from accidents that go beyond pure economics, e.g., pain, disability, emotional stress. Some of these personal impacts have been investigated in "Injury: An Ontario Survey of the Societal and Personal Costs of Hospitalized Motor Vehicle Accident Victims", MTC, 1981. The present report focuses on economic costs only.

2.2/ The Costs Associated with Motor Vehicle Accidents

2.2.1/ Property Damage

A reportable accident is defined as an accident which has damaged at least $400 worth of property. Property includes vehicles, contents, buildings, structures (bridges/guardrails/lamps and poles, etc.) and even the road itself. Damaged property will require resources to either repair it or replace it; hence, the loss of real wealth to society.

In 1980 the total estimated property damage per police report records was $357 640 284.

2.2.2/ Health Care Costs

Where injury is incurred by the driver, passenger, or pedestrian, medical care may be required. Health care includes: emergency services such as ambulance and hospital emergency department service; hospital beds and use of specialized equipment; nursing services; medical doctor treatment and specialized post-hospital care; such as physiotherapy, psychotherapy, or nursing home care.

The following average cost figures (Table 2) were taken from a 1978 Ontario Government Study of Motor Vehicle Accident Injury health care costs. Unfortunately, they apply only to injury victims who went to hospital shortly after their accident.

Table 2/ Average Expenditures per Victim Who Incurred Respective Component Cost

	1976 (at 1975 Rates)
Hospital Care (In-Patient)	$1 515.03
Emergency Dept. (Out-Patient)	18.10
Therapy Treatment	58.15
Medical Fees	59.55
Average Active Treatment Costs per Victim (All Victims)	$ 361.00

Source: Changes in the Number and Cost of Motor Vehicle Injury Victims in Ontario. MOH/MTC, 1978, P. 27.

Location of the injury can affect the cost, as seen in Table 3.

Table 3/ Average Total Cost of Active Treatment By Injury Location

	1976 (at 1975 Rates)
General, external/ multiple areas	$ 168.00
Head	261.00
Neck and Cervical Spine	243.00
Chest and Thoracic Spine	473.00
Abdomen and Lumbar Spine	1 438.00
Pelvic Girdle	1 067.00
Extremities	511.00
Mind (Psychological)	79.00
Back	114.00
Not Classified	74.00
Average Total Cost	$ 361.00

Source: Changes in the Number and Cost of Motor Vehicle Injury Victims in Ontario. MOH/MTC, 1978, p. 40.

As one would expect, the average health care cost does vary directly with the degree of the injury, as shown in Table 4.

Table 4/ Average Total Cost of Active Treatment By Injury Severity

Severity of Injury	1976 (at 1975 Rates)
Minor	$ 58.00
Moderate	1 113.00
Severe (not life-threatening)	2 297.00
Serious (life threatening)	4 027.00
Critical (Survival threating)	4 924.00
Maximum (Untreatable)	1 532.00
Unknown	128.00
Total (Average)	$ 361.00

Source: Changes in the Number and Cost of Motor Vehicle Injury Victims in Ontario.

By applying an inflation factor of 65% (1975-1980) to these figures, the 1980 average active treatment cost would be $596. This figure would be only nominally higher if ambulance costs and cost for extended disability treatment are added in.

2.2.3/ Production Losses

Where a productive member of the community is involved in an accident, there may be a temporary or permanent loss of productive output. There may also be a loss of income to the worker and his family.

The dollar value of these losses will vary considerably depending on his or her employment circumstances. For example, there may be an unemployed person who could step into his job with little or no loss in production, or it could take weeks or months to replace a key scientist on a complex research project.

However, a simplifying assumption can be made that there is an economic loss equal to the wages multiplied by the days of work lost for injured workers. It is also arbitrarily assumed that there is no measurable economic loss incurred from a fatality, although the personal loss may be great. A further assumption made is that housewives are considered to have an economic value equal to the average female wage.

Wage loss is taken as a function of average days of work/housework missed and the wage rate.

The recent Injury Study found that taken as a percentage of total injured victims (whether they missed work or not), the average number of days of work missed is 15.7 and for housework 14.4 [1]. Average weekly wages and salaries taken from Statistics Canada for Ontario (1980) were $309 [2], and average female wages and salaries were $202 [3]. Hence, the average economic value placed on lost production due to injury is [(15.7 x $309 ÷ 5) + (14.4 x $202 ÷ 5)] = $1552 per injured victim.

2.2.4/Funeral Cost

Although we have made the arbitrary assumption that a fatality results in no measurable production loss, there is an advancing of the time of a funeral and its cost. Here the economist uses the concept of "Present Value" based on the time value of money; i.e., that money has a different value today than in, for example, the year 2010. Therefore, future dollar values are "discounted" by an interest-type rate to their present values.

However, since the average number of years to expected natural death is so large, (32 to 42 years), the present value of a future funeral cost is virtually nil.

Hence, the average current funeral cost ($1650)[1] is the economic value of resource cost.

2.2.5/ Insurance Operating Expenses

This is one of the chief resource costs associated with accidents. Included in the costs are internal legal costs, adjuster and appraisal costs, direct administration, and allocated general administration.

For 1980, the ratio of operating expense to premiums earned was 22.0% [4]. Since insurance costs are allocated on a claim basis rather than a victim or accident basis, we can only report the provincial total. Total actual premiums earned in Ontario for 1980 were $1.2 billion [4]; hence, the total motor vehicle insurance operating cost was $264 million.

2.2.6/ Legal and Court Fees

It has been difficult to obtain data on legal and court fees; however, the recent survey of injured victims has provided us with some insight into these costs. When averaged across all injured victims (whether or not they had legal/court costs), the average legal/court cost was $145.00 (in 1975 to 1979 dollars). This would be approximately $175.00 in 1980 dollars.

2.2.7/ Accident Investigation

This cost includes police investigation and in the case of a fatality, coroner (and inquest) costs as summarized in Table 5.

Table 5/ Accident Investigation Costs

Accident Type	Person Hours	Dollar Cost
P.D.O.	2.0	$ 24.00
Injury	2.9	35.00
Fatility	18.6	223.00

Source: Ontario Provincial Police, Activity Summary Disposition. Quarterly Report, July - September, 1978.

2.2.8/ Cost to Friends and Relatives

A very common personal cost is that incurred by concerned friends and relatives. These costs include taking time off work, transportation costs, flowers, etc. When averaged over all injury accident victims, the dollar amount is nominal [5].

3/ Provincial Estimate of Total Economic Costs

The following table synthesizes the accident facts from Table 1 and the various economic costs from the body of the report. The total for 1980 exceeded three-quarters of a billion dollars.

Table 6/ ONTARIO ESTIMATE OF MOTOR VEHICLE ACCIDENT ECONOMIC COSTS (1980) [1]

Property Damage Costs	$357 640 284
Health Care Costs	(101 367 x 55% x $596)* $ 33 228 102
Lost Production	(101 367 x 55% x $1552) $ 86 526 871
Insurance Operating Cost	$264 000 000
Legal and Court Fees	(101 367 x 55% x $175) $ 9 756 574
Accident Investigation	(127 814 x $24) +(67 391 x $35) +(1 296 x $223) = $ 5 715 229
Total	$756 867 060

*This 55% adjustment represents "hospitalized" victims. No cost estimate is offered for the remaining 45% of injured victims; hence, total costs are <u>understated</u>.

[1] See References 1 and 5 for an assessment of the 'softer' costs of human suffering, anxiety, et cetera.

4/ REFERENCES

[1] Injury: An Ontario Survey of the Societal and Personal Costs of Hospitalized Motor Vehicle Accident Victims. MTC, 1981, p. 134.

[2] Statistics Canada, 11-003E, Canadian Statistical Review. May, 1981.

[3] Statistic Canada, 13-207, Income Distribution by Size in Canada. 1979.

[4] Automobile Insurance Experience for All Provinces in Canada. Insurance Bureau of Canada, 1980.

[5] Injury: An Ontario Survey of the Societal and Personal Costs of Hospitalized Motor Vehicle Accident Victims. MTC, 1981, p. 25.